DOCUMENT RESUME

ED 159 013 SE 024 787

TITLE Short Training Course in Oceanography. Red Sea & Gulf of Aden Programme (PERSGA).
INSTITUTION Arab Organization for Education and Science, Cairo (Egypt).
PUB DATE [76]
NOTE 9p.; For related documents, see SE 024 782-786; Contains light and broken type

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Conservation Education; *Course Content; *Curriculum; Educational Programs; Environmental Education; Instruction; *Oceanology; *Professional Training; Science Education; Sciences; *Training Techniques
IDENTIFIERS Arab States

ABSTRACT

This document presents a training course in oceanography intended for Junior Bachelor of Science (B.S.) graduates in physics, mathematics, chemistry, zoology, botany or geology to give them the minimum qualifications required to work in any of the marine science stations. This 14-week course, organized by the Arab League Educational, Cultural and Scientific Organization (ALECSO), is developed by the staff of Aqaba Marine Science Station, Jordan. It is divided into two stages: the first stage (four weeks) concentrates on a general course for all specializations, while in the second stage (nine weeks) the trainees have four specialization options: (1) Physical group; (2) Chemical group; (3) Geological group; and (4) Biological and Fisheries group. A field training for one week is included as a part of the course. The distribution of hours and the course syllabus are also presented. (HM)

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ED159013

THE ARAB EDUCATIONAL CULTURAL
AND SCIENTIFIC ORGANIZATION

109, Tahrir Str. - Dokki-Cairo
A. R. Egypt

Red Sea & Gulf of Aden Programme
PERSGA

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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SHORT TRAINING COURSE
IN OCEANOGRAPHY

SE 024 787

SHORT TRAINING COURSE
IN OCEANOGRAPHY

The training course is intended for junior graduates (B. Sc. level) in: Physics , Mathematics, Chemistry, Zoology, Botany or Geology, to give them the minimum qualification required to work in any of the marine science stations. Such trainees are expect to take part in both the laboratory and field activities of the stations.

The duration of the course is 14 weeks divided into two stages: the first stage (4weeks) will concentrate on a general course for all specialisations, while in the second stage (9 weeks) the trainees will distributed among 4 lines of specialisation, viz.,

Physical Group.
Chemical „
Geological „
Biological & Fisheries Group.

A field training for one week would take the trainees to one or another suitable location on the Red Sea coast to collect samples and to make field observations in respective lines of specialisation.

The total of study hours is 180 hours lectures, 190 hours pratical and a week for field work.

1. First Stage: General:

In this stages a general prepartory course for all specialisations is given in 4 weeks (90 hours theoretical + 40 hours practical):

	Lectures	Practical
Introduction on the History and Progress of Marine Sciences	5	-
Physical Oceanography	15	-
Chemical „	15	15

Geological Oceanography	15	-
Biological „	15	15
Marine Resources & their Management.	10	-
Sources of Pollution and their Environmt-al Impacts.	5	-
Legislation for Environmental Protection		
Statistical Processing and Presentation of data.	10	-
Total	90	40

The substance of this course should aim at presenting the sea as an environmental ecosystem integrating the physical, chemical, geological factors with its living communities. Various interlationships within the systems and its effects on marine life, besides the general productivity and food chain in the sea should be brought to light. The syllabus would be simple, straight forward and inspiring love, respect and interest in unfolding the mysteries of the living seas.

II. Second Stage: (90 hours theoretical 150 hours practical and one week field work)

In this stage, trainees are directed to the specialisations compatible with their B.Sc. and satifying their interests. They would, then, be given an adequate basic knowledge in their respective specialisation comcentrating on the use, operation and upkeep of laboratory and field equipment; and comcentrating on making observations, collecting samples and preparing it for further analyses & carrying out laboratory analyses and other, Participants should be trained to present data in graphic, tabular and other forms, and to prepare a proper scientific report of their work.

I. PHYSICAL GROUP

(A) Lectures: (90 hrs.)

Physical Oceanography (20 hrs.)

Physical properties of sea water, salinity, temperature, density, transparency & propagation of sound - Methods of measuring these parameters.

Dynamical Oceanography (40 hrs.)

Principles of Hydrodynamics - Hydrodynamic Equations - Waves - Tides and tidal streams - Currents - Thermodynamics and its marine applications - Water masses and water circulation in oceans and seas, with special emphasis on the Red Sea and the Gulf of Aden.

Marine Meteorology (15 hrs.)

Air sea interaction.

Marine Surveying & Cartography (15 hrs.)

General navigation - Marine surveying Tides - Preparation of charts.

(B) Practical: (150 hrs.)

1. Use of field equipment, e.g., reversing thermomenters and corrections - Measurement of transparency - Determination of water density - Determination of electric conductivity of sea water and its relation to salinity - Measurement of rate and direction of currents, Instruments for wave and tidal observations. (50 hrs.)
2. Use of meteorological instruments - Interpretation of meteorological data - Use of instruments for marine surveying and cartography. (20 hrs.)
3. Calculation of depths at sea - Calculation of & water density and dynamical calculation - Processing of oceanographic observation. (80 hrs.)

II.CHEMISTRY GROUP

(A) Lectures.

1. Chemical composition of sea water - Abundant and trace metals in sea water; their presence, importance and methods of extraction. (25 hrs.)
2. Dissolved gases. pH - Alkalinity and Calcium cycle in sea water.(15 hrs.)
3. Dissolved and suspended organic matter; methods of estimation.(20 hrs.)
4. Nutrient salts (Phosphates, Nitrates, Nitrites & Silicates); methods of estimation - Dynamics of nutrient salts; horizontal & vertical distribution and seasonal variation.(20 hrs.)
5. Productivity of the sea and methods of estimation. (10 hrs.)
6. Chemistry of sea water pollution.(10 hrs.)

(B) Practical

1. Training on sampling of sea water by reversing water bottles - Treatment of water samples and, in situ, estimation of some variables. Methods of determination of salinity (gravimetric, nitration, electric conductance)- Determination of dissolved oxygen, pH & alkalinity in sea water.(40 hrs.)
2. Methods of estimation of nutrient salts by spectral analysis (Phosphates, Nitrates, Nitrites and ilicates). Determination of organic matter. (20 hrs.)
3. Methods of estimation of Calcium, Magnesium, Iron, Copper and Manganese in sea water.(50 hrs.)
4. Classification, interpretation and presentation of results of laboratory and field studies.(10 hrs.)
5. ethods of estimation of trace elements. (hrs.)

III. GEOLOGY GROUP:

(A) Lectures: (90 hrs.)

1. Topography of ocean and sea bottoms with particular emphasis on the Red Sea and the Gulf of Aden - Geological importance of the sea as a destructive agent, erosion and accretion formation of coral reefs. (20 hrs.)

2. Marine sedimentation . Recent marine sediments, sources, transportation, deposition and distribution on the sea bottom - Rate of sedimentation, accumulation, deposition and distribution of calcuim carbonate. (50 hrs.)

3. Presence and activity of bacteria and organic matter in recent marine sediments. (10 hrs.)

4. Geochemistry of recent marine sediments. (10 hrs.)

(B) Practical:

1. Training on the use of apparatus for sampling marine sediments from the sea bottom, e.g., the gralbs and the corer - Preparation and preservation of sediment samples for laboratory analysis. (20 hrs.)

2. Methods of studying recent marine sediments, physical properties (water content, density, grain shape, porosity), mechanical analysis for grain size . (40 hrs.)

3. Metals in recent marine sedimentation. (20 hrs.)

4. Chemical analysis of sediments (determination of calcium Carbonate, Magnesium, total Phosphyurus and organic matter). (30 hrs.)

5. Micro-organisms in sediments (Diatoms, Foraminefera, Radiolaria, Stracoda) . (20 hrs.)

6. Preparation, treatment and presentation of the results of studies in recent marine sediments. (hrs.)

IV. BIOLOGY & FISHERIES GROUP

(A) Lectures :

1. Various methods of collecting and preserving specimens of marine organisms, and their laboratory treatment. Instruments and chemical used.(5 hrs.)
2. Basics of classification of marine organisms: Phyto and Zoo-plankton, benthos and fishes.(30 hrs.)
3. Methods of determination of productivity: Phytoplanktonic, zooplanktonic and benthic - Environmental factors effecting productivity - Relation between planktonic productivity, benthic organisms and fishes - Seasonal and geographical distribution of organisms with reference to the origin and presence of the marine organisms in the Red Sea.(30 hrs.)
4. Fish & Fishery biology: Fish biology (estimation of age, sex, ... etc.), Fishery biology (Fecundity of group analysis)- General methods of stock assessment.(30 hrs.)

(B) Practical: (150 hrs.)

1. Sorting and preserving specimens of marine organisms and laboratory treatment.(20 hrs.)
2. Classification of marine algae, phytoplankton, zooplankton and benthos - Classification and dessication of fishes.(50 hrs.)
3. Methods of determining productivity (Phytoplankton, zooplankton and benthos).(20 hrs.)
4. Methods of fishing and fish-gear. (15 hrs.)
5. Fish and fishery biology (length, age, sex, fecundity et. and group analysis) . (25 hrs.)
6. Preparation and presentation of results of field and laboratory studies in a scientific report.(20 hrs.)

SCIENTIFIC DIVING TRAINING COURSE

The programme of the training course was prepared by the Staff of the Aqaba Marine Science Station, Jordan; at the request of the PERSGA Directing Board. It is hoped that this course may be executed in 1979.